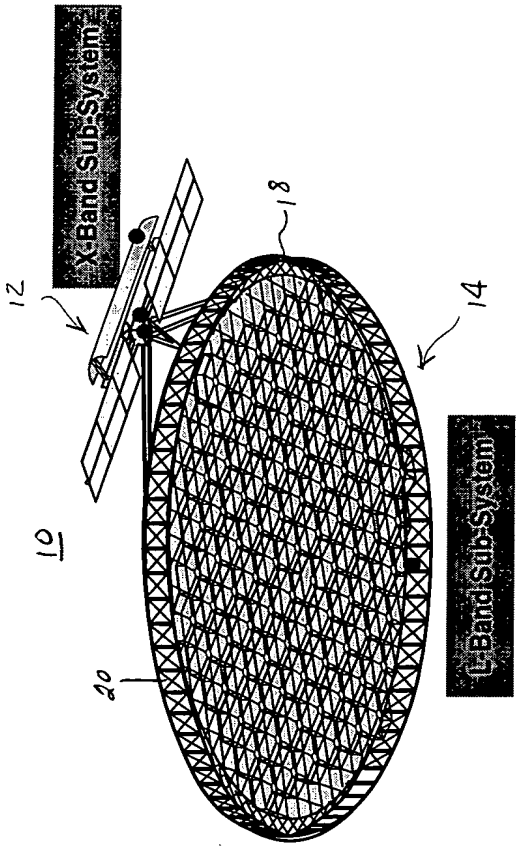


FIG. 1

- 91-Reflector Super Elements, 22
- Reflector Super Element, 22
  - Width: 4.45 m
  - Focal length: 2.225 m
  - Feed: 37 element array, 34

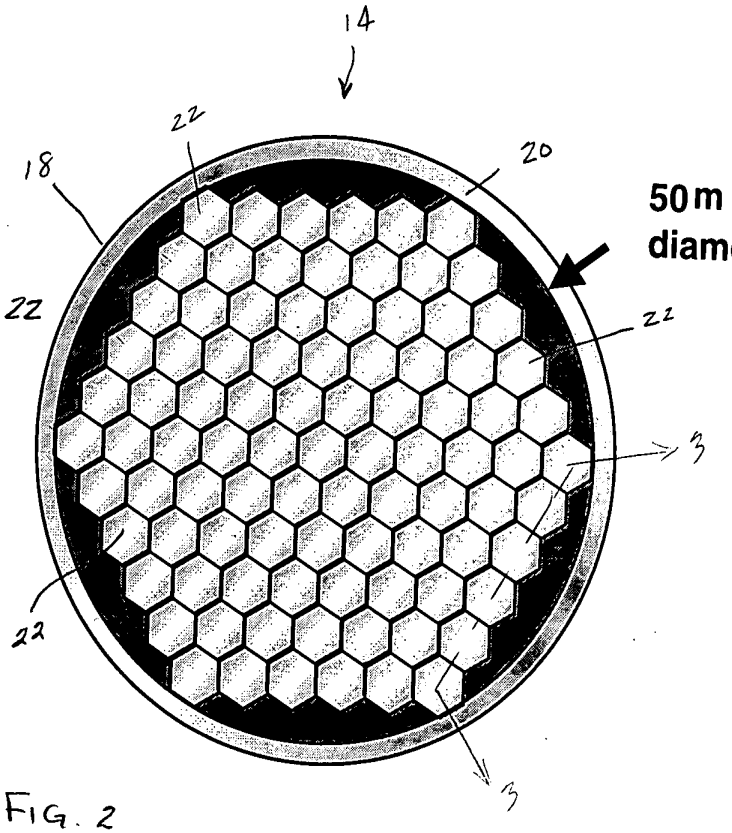


FIG. 2

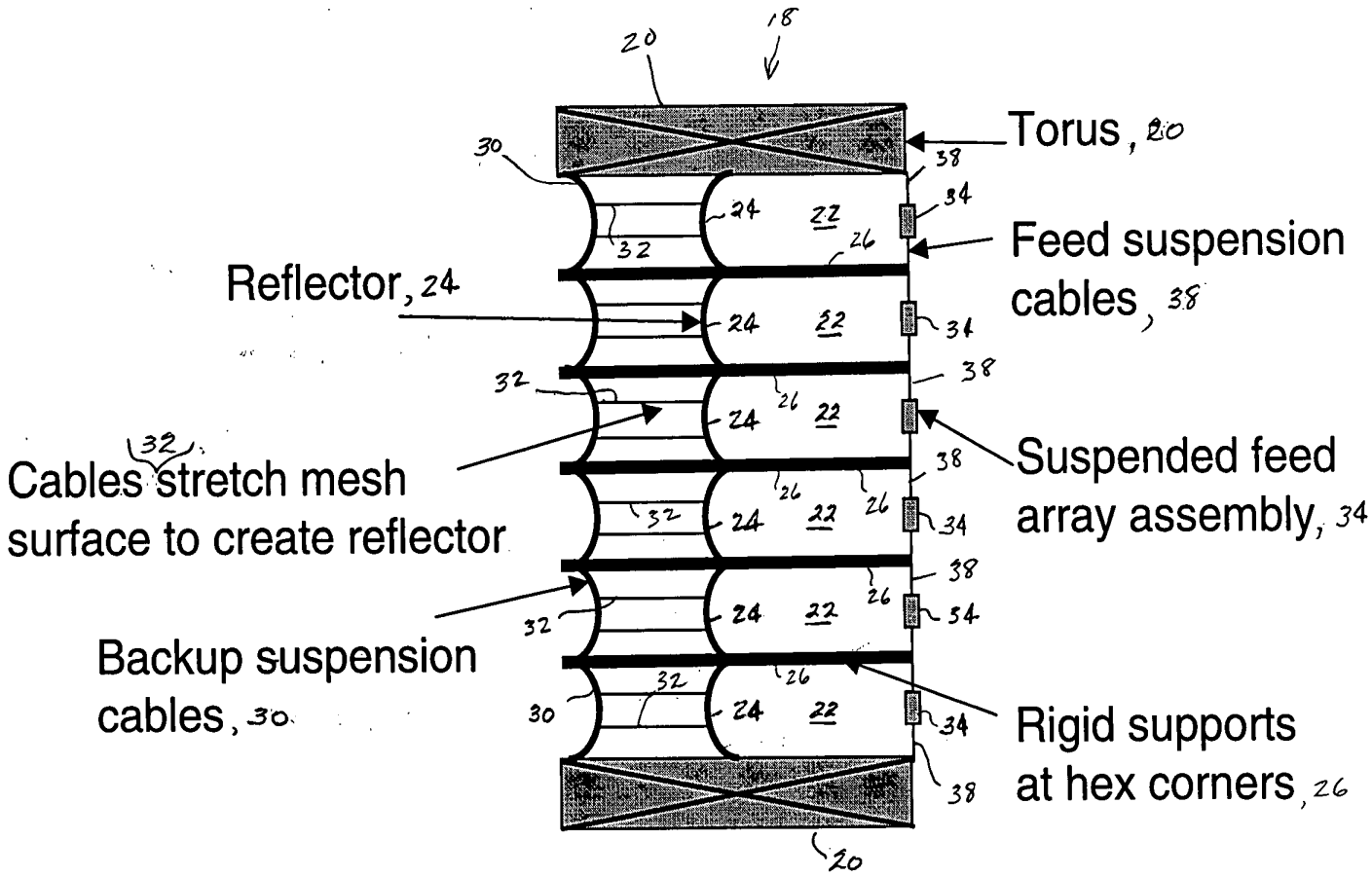
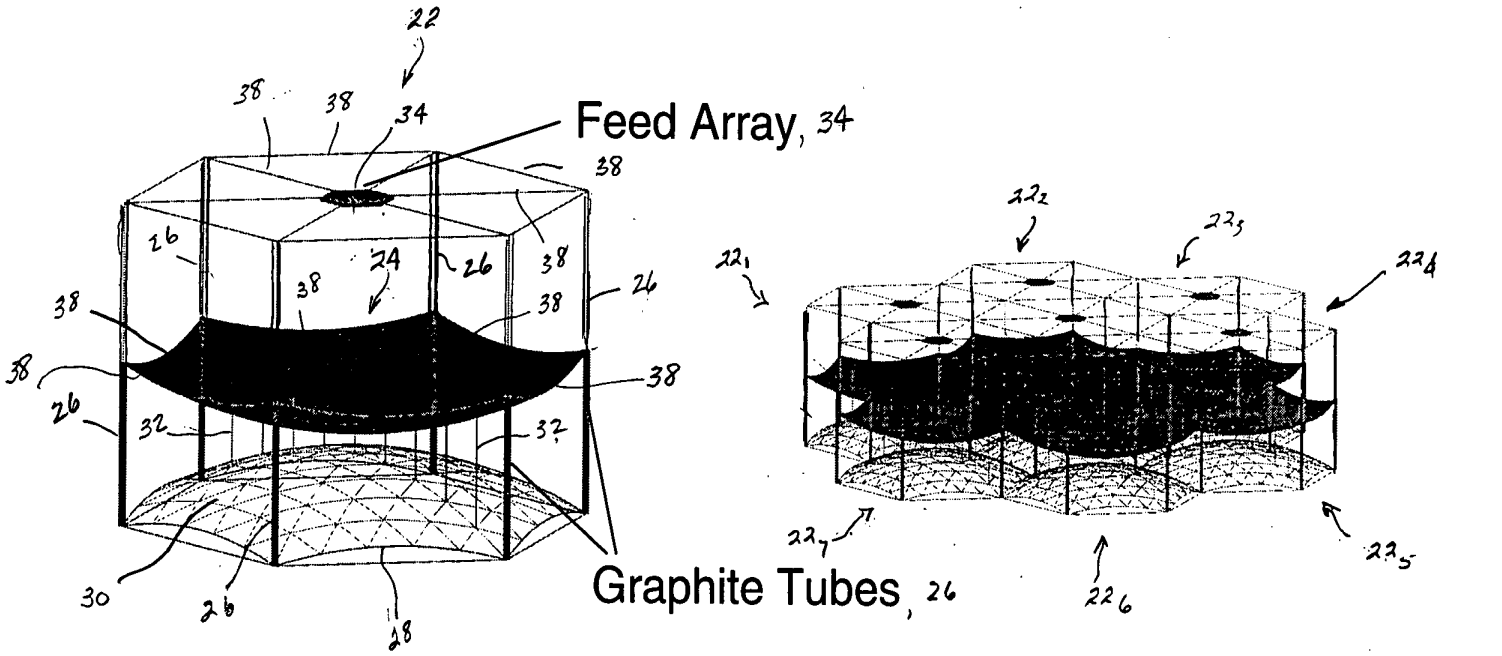


FIG. 3

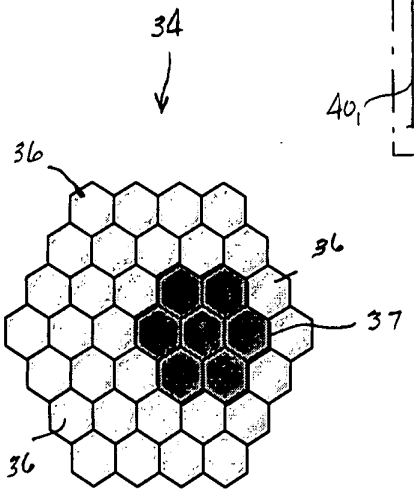


a. Details of single cell, 22

FIG. 4A

b. Group of 7 cells $22_1 \cdots 22_7$

FIG 4B



FIG

7-Elements Turned on for Tx & Rx

FIG. 5

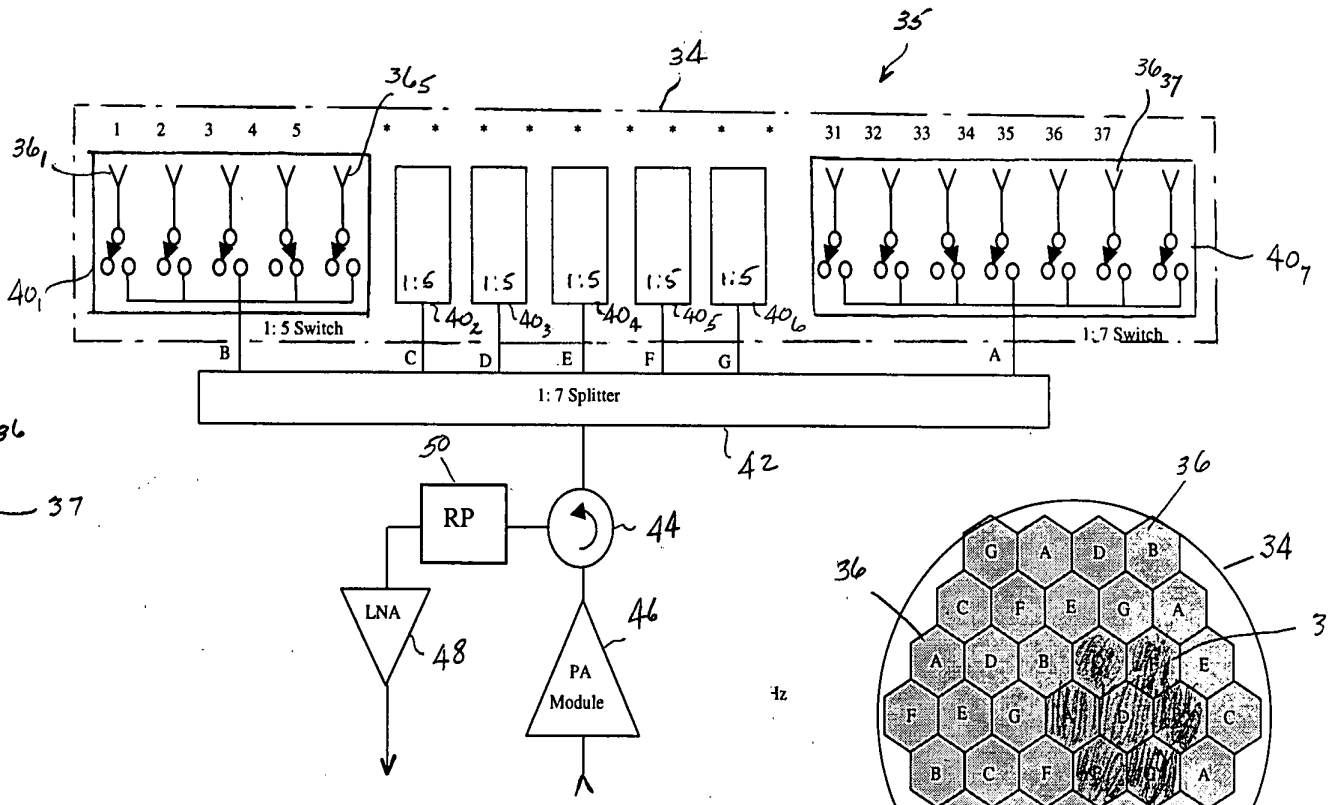


FIG. 6

FIG. 7

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1215- 399P

Examples of Feed Selection

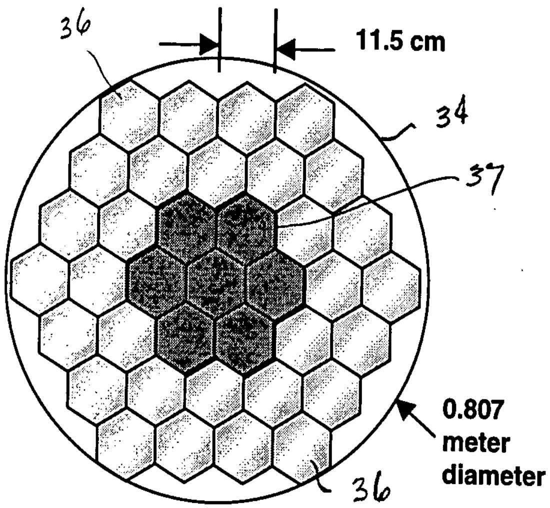

FIG 8 a.

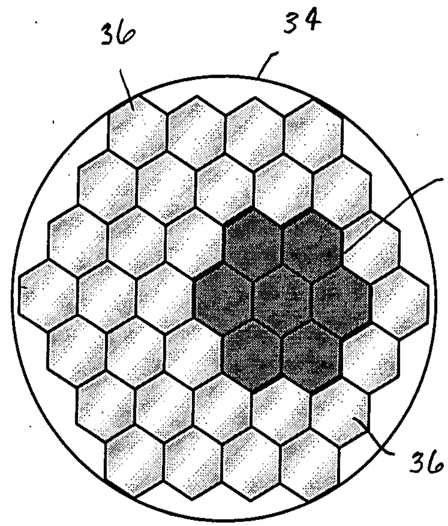

FIG. 8 b.

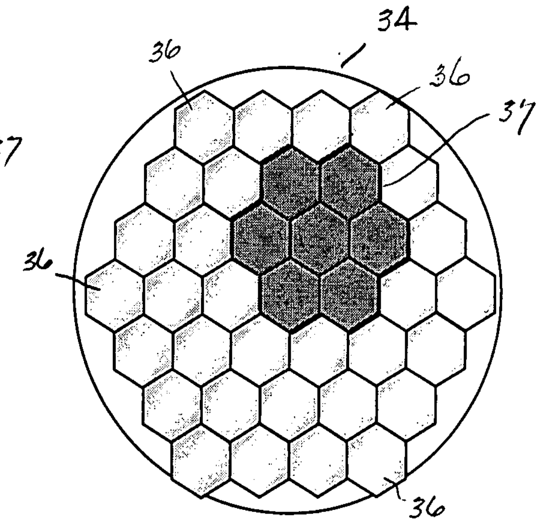

FIG 8 c.

Power is Distributed to a Similar Group
of 7 Elements in Each Feed

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Optimum Beam For Central Feed Group
Time Delay Units Steer Array Factor to 0º

Group selected steers 'super element' beam to 0°

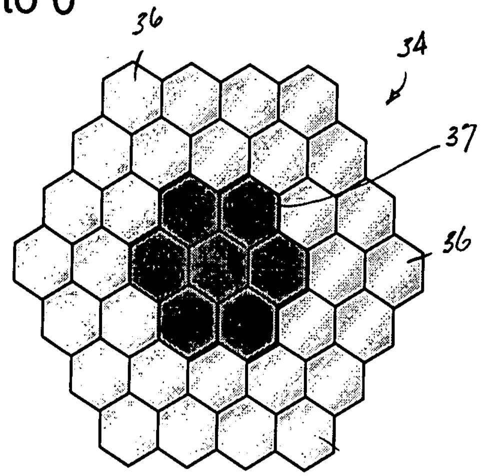

FIG. 9A

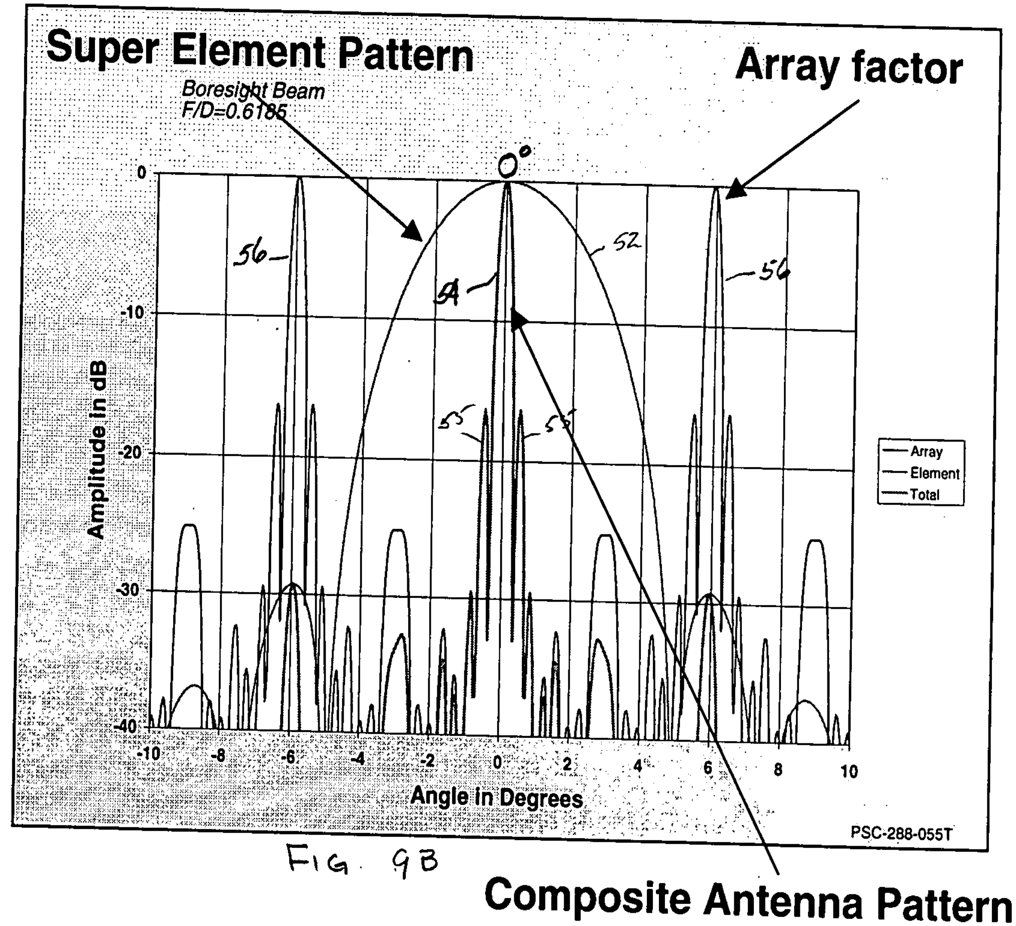

FIG. 9B

Beam at Limit For Central Feed Group Time Delay Units Steer Array Factor to 1.1º

Group selected steers 'super element' beam to 0°

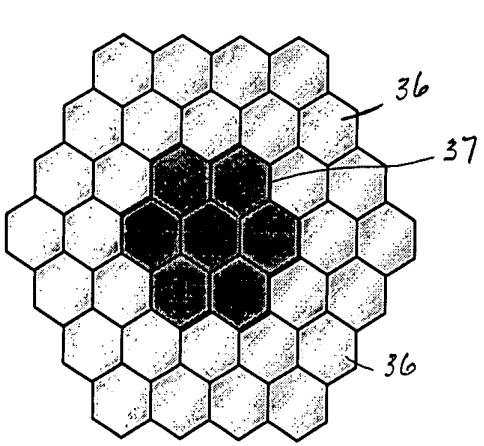

FIG. 10A

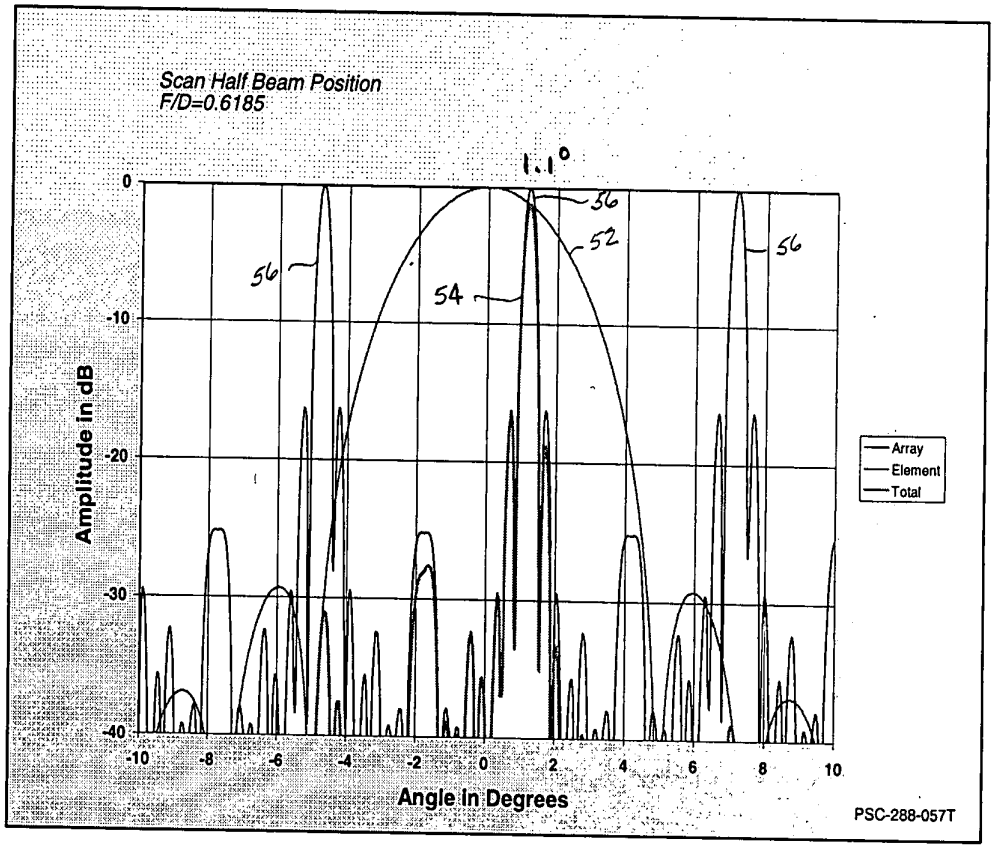

FIG. 10B

Optimum Beam For Offset Feed Group Time Delay Units Steer Array Factor to 2.4º

Group selected steers 'super element' beam to 2.4°

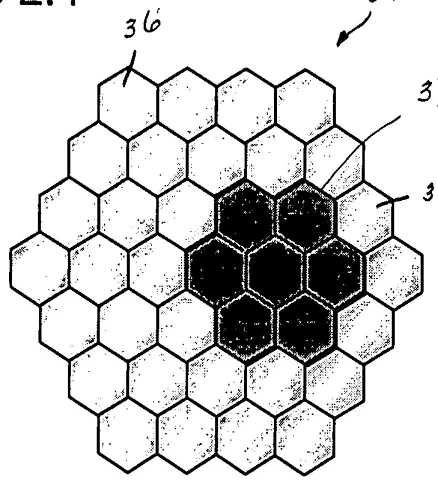

FIG. 11A

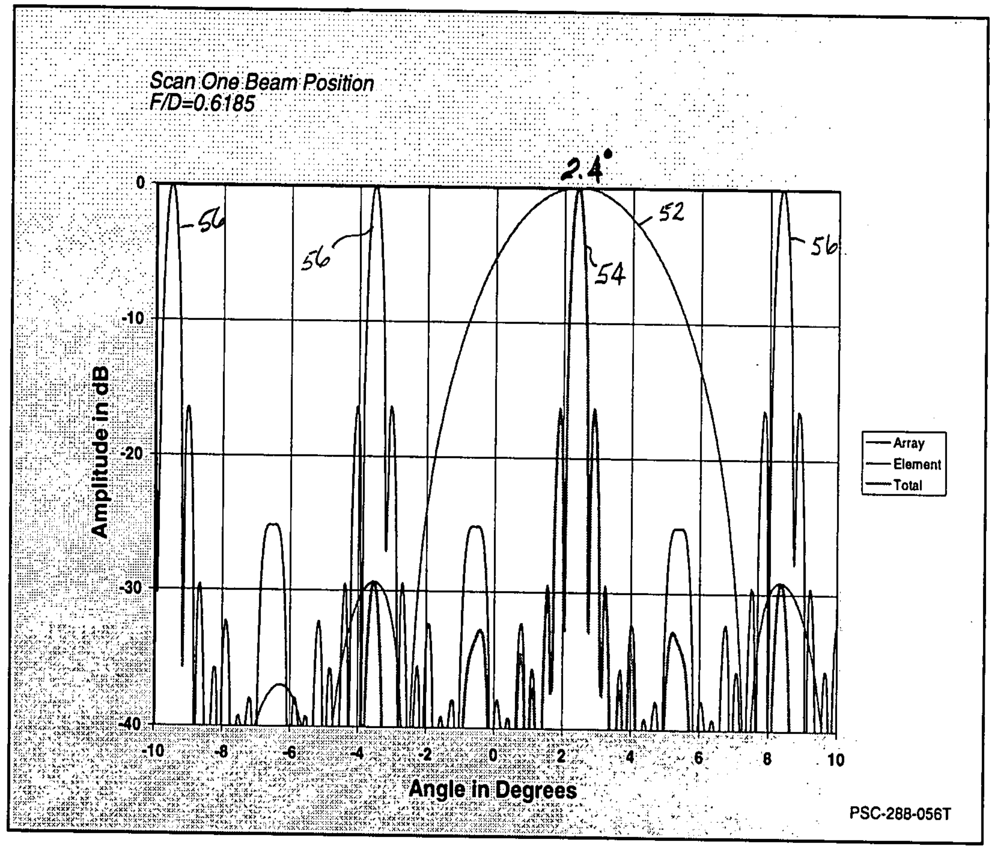

FIG. 11B

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Scan Limit For Outer Most Feed Group Time Delay Units Steer Array Factor to 6º

Group selected steers 'super element' beam to 4.8°

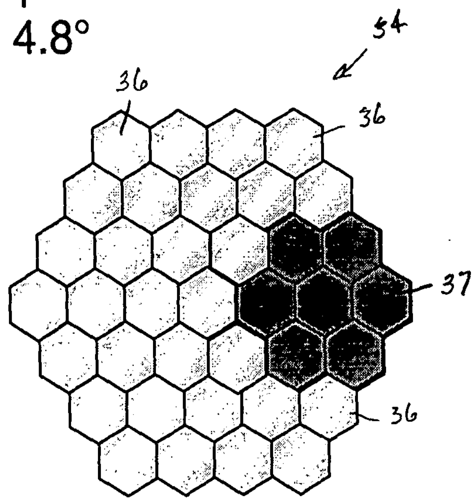

FIG. 12A

Note: Only 1.5 dB Off-Boresight Loss at 6º Scan

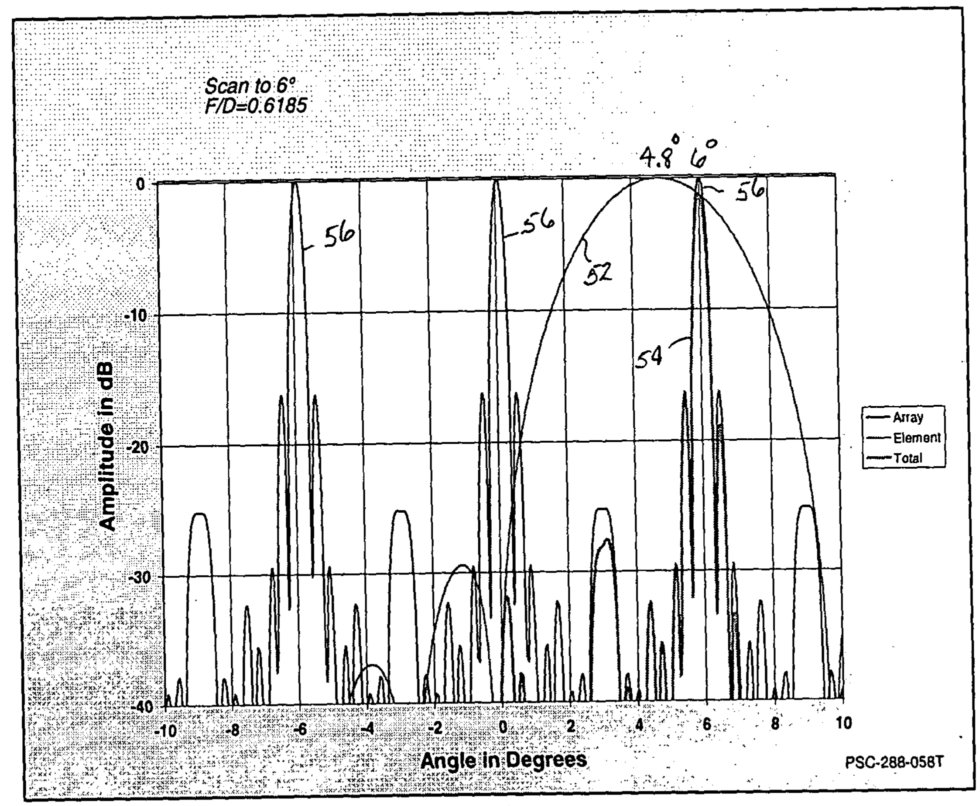

FIG. 12B

An Example of the Grating Lobe Problem
Steer Array Factor in Elevation to 1.386º

Group selected steers 'super element' beam to 0°

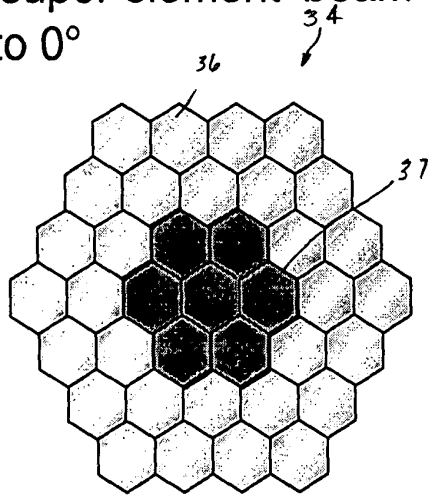

FIG. 13A

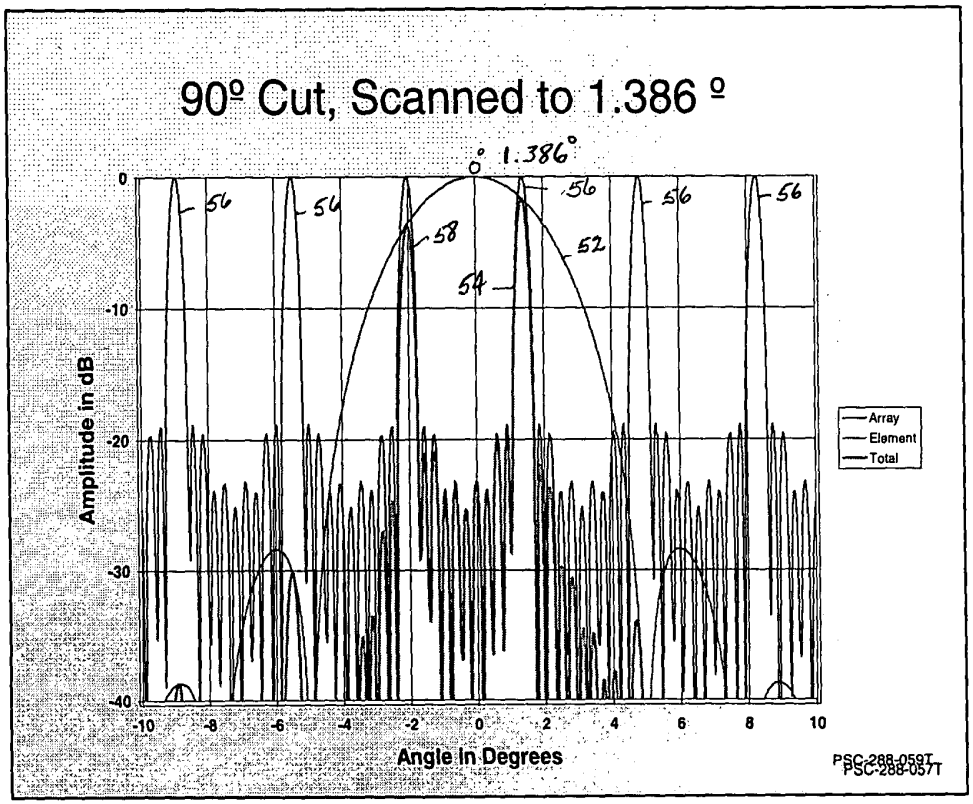

FIG. 13B

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The Grating Lobe is Reduced By Selecting a Reduced Element Set at the Right Location

Reduced off-center group selected steers 'super element' beam to 1.386°

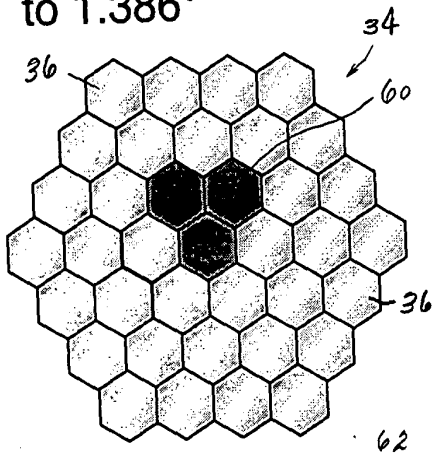

FIG. 14A

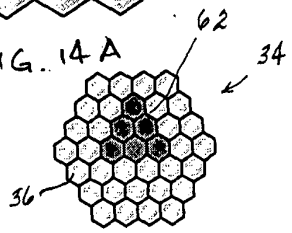

FIG. 14C

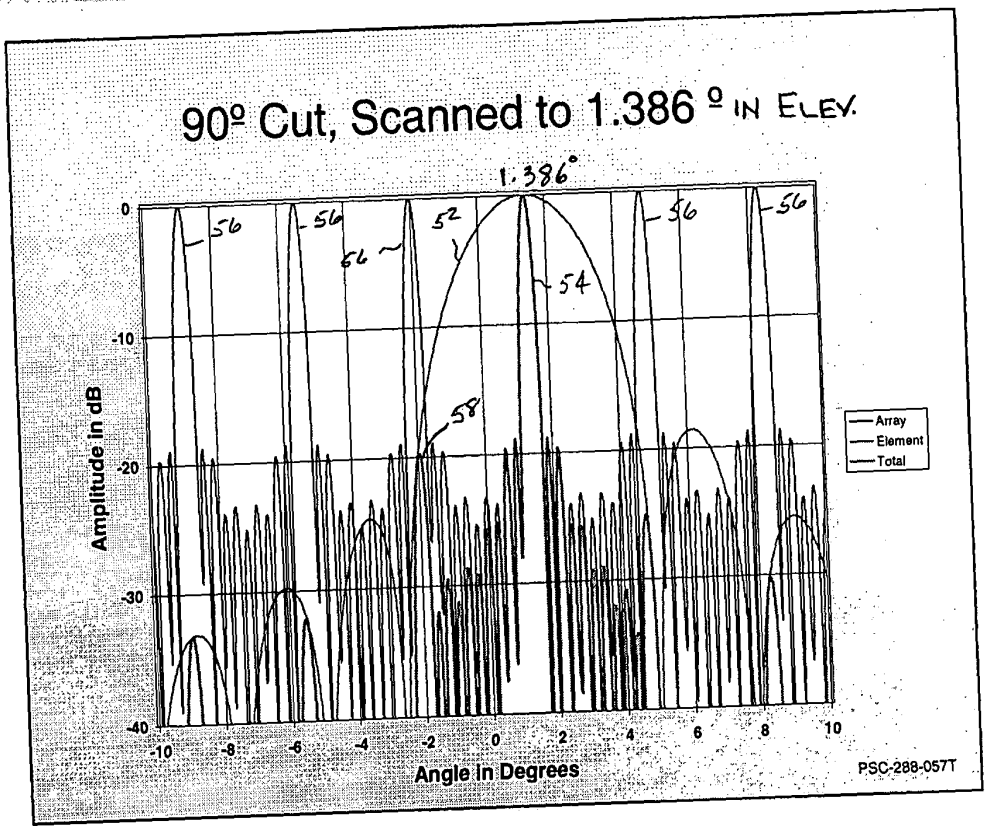

FIG. 14B

The Grating Lobe is Reduced by Randomly Selecting Groups About the Optimum Position

Randomly select feed groups from 3-groups

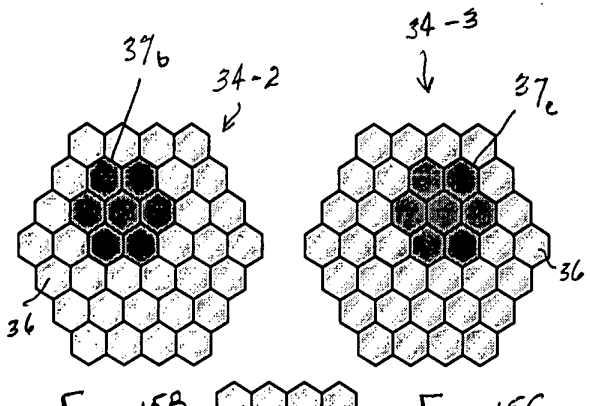

FIG. 15B FIG 15C

FIG 15A

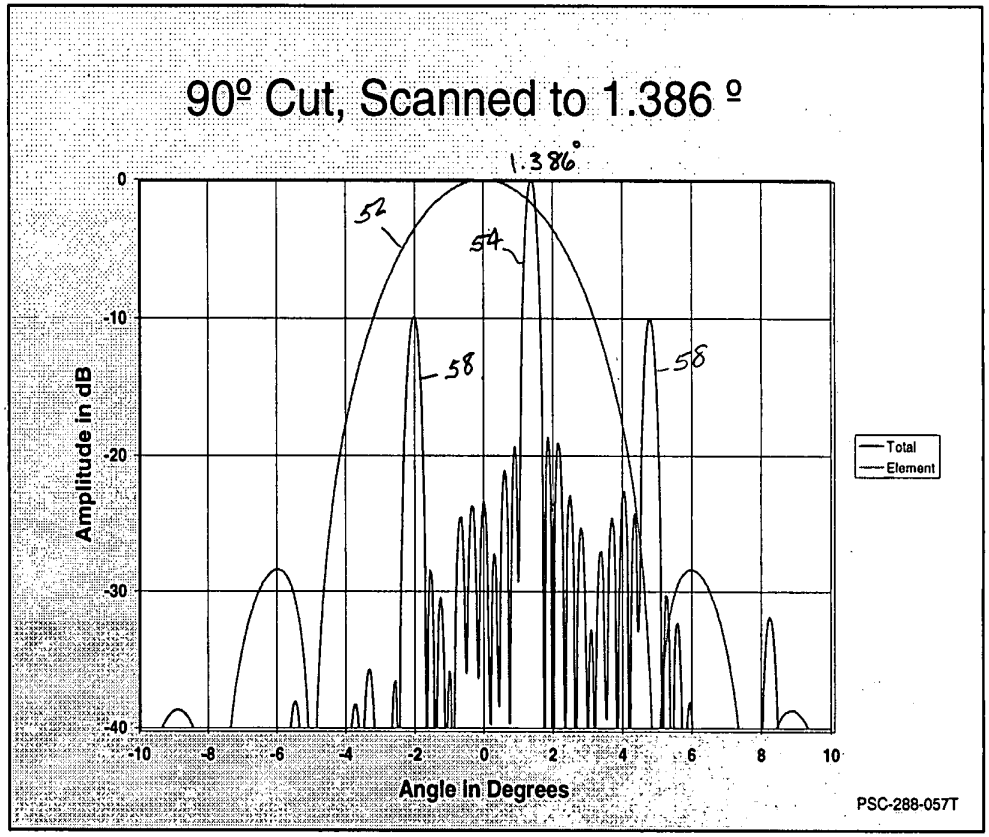

FIG. 15D

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1215-5595

Gradual Transition is a Way to Translate Between Beams

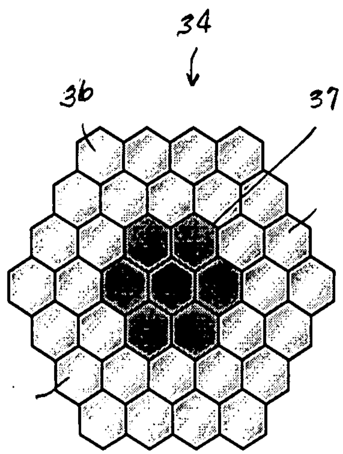


FIG. 16A

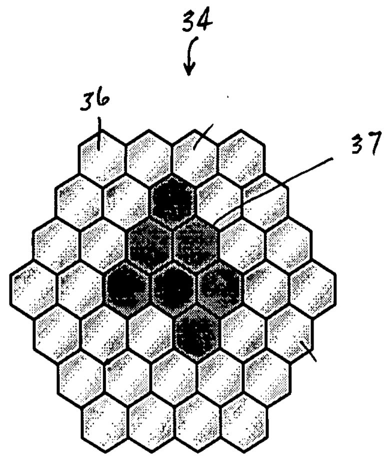


FIG. 16B

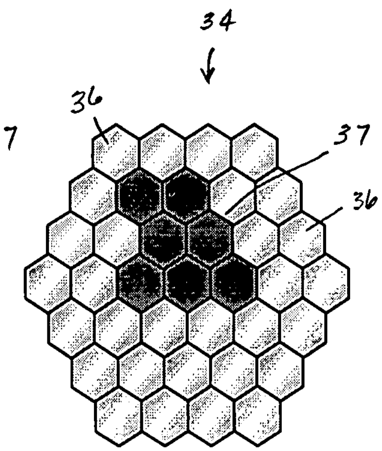


FIG. 16C

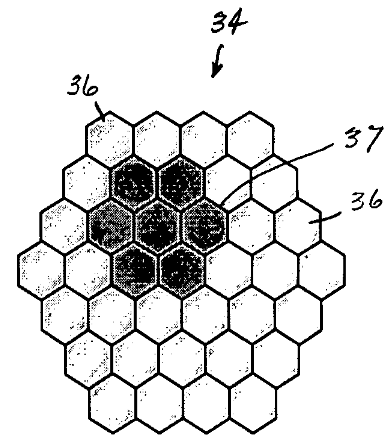


FIG. 16D

Advantage is it uses the same number of feed elements

Random Positioning Feed Array on Focal Axis

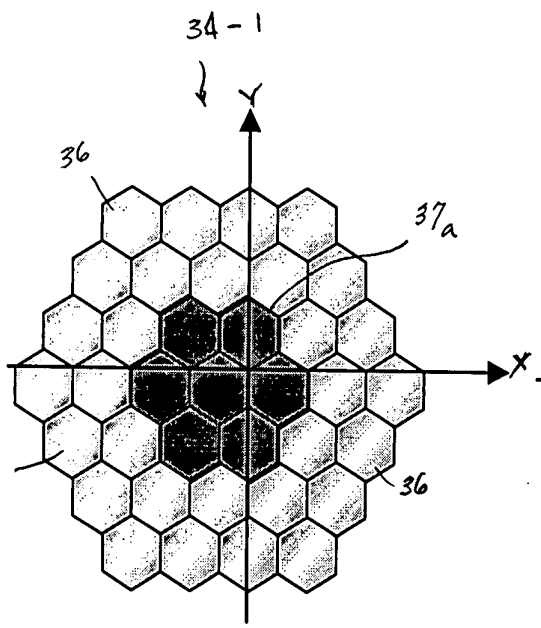


FIG. 17A

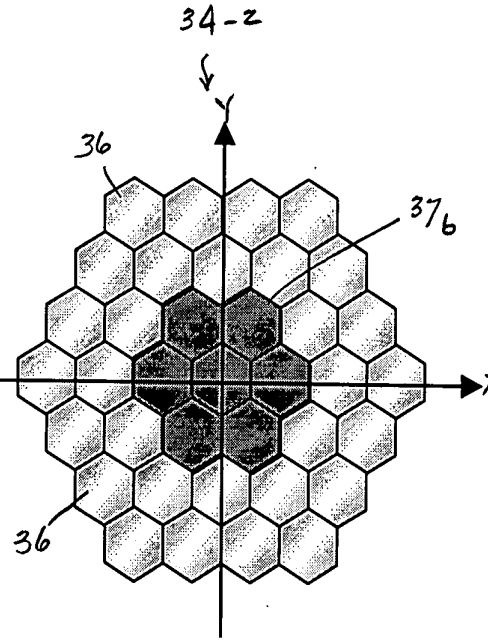


FIG. 17B

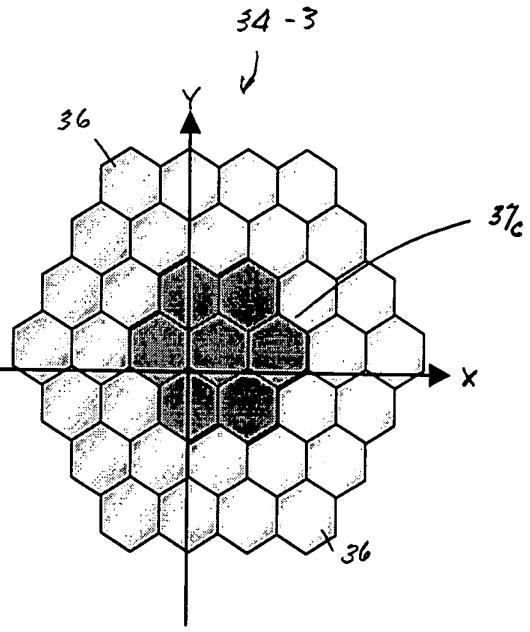


FIG. 17C

Overlapping Feed Distributions to Steer Horizontally Half Way Between Nominal Beam Positions

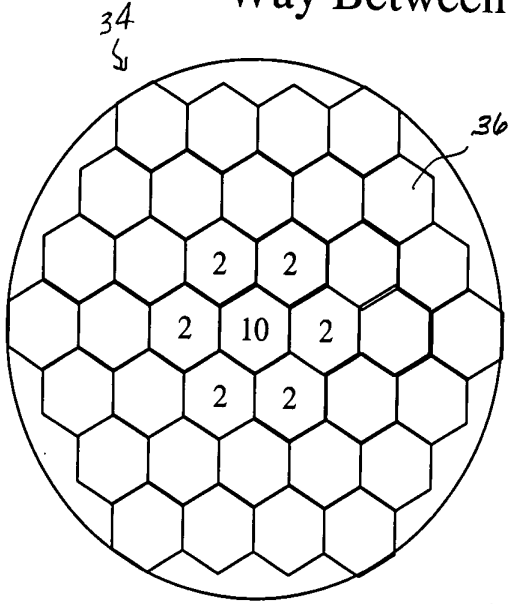


FIG. 18A

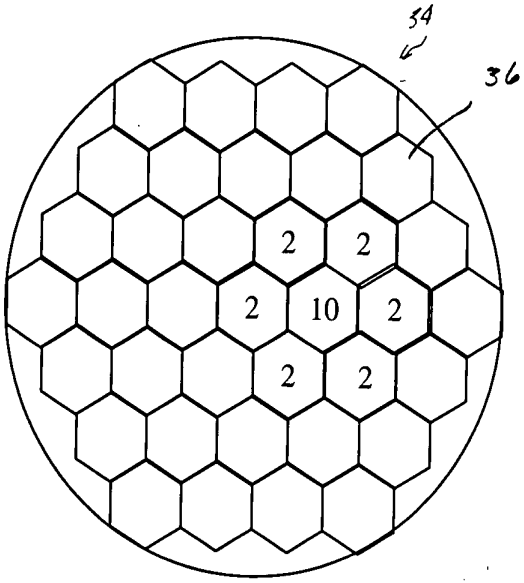


FIG. 18B

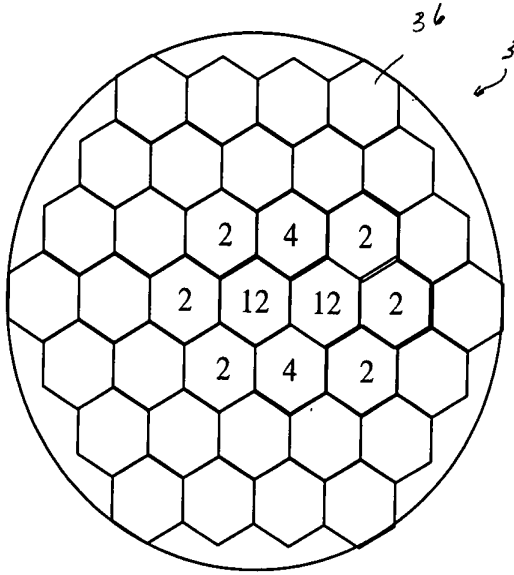


FIG. 18C

Composite

Overlapping Feed Distributions to Steer Vertically Between Nominal Beam Positions

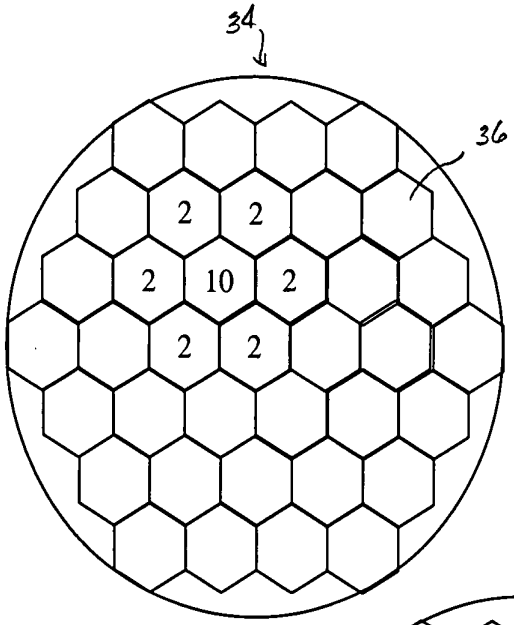


FIG. 19C

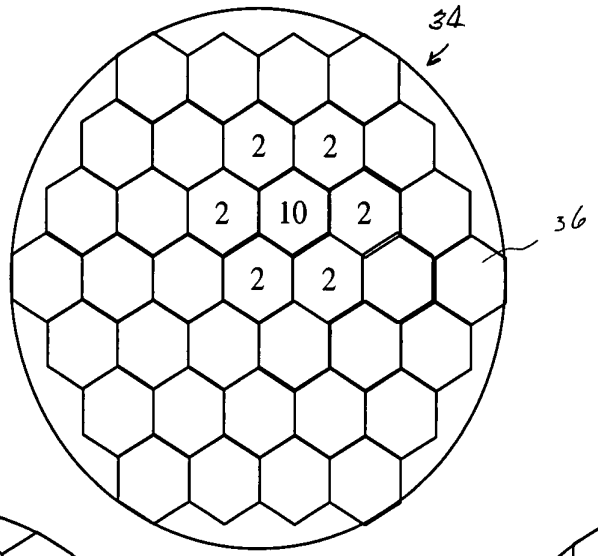


FIG. 19B

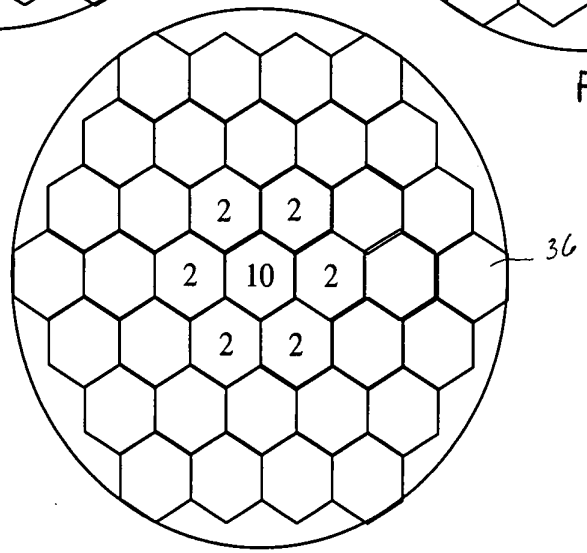
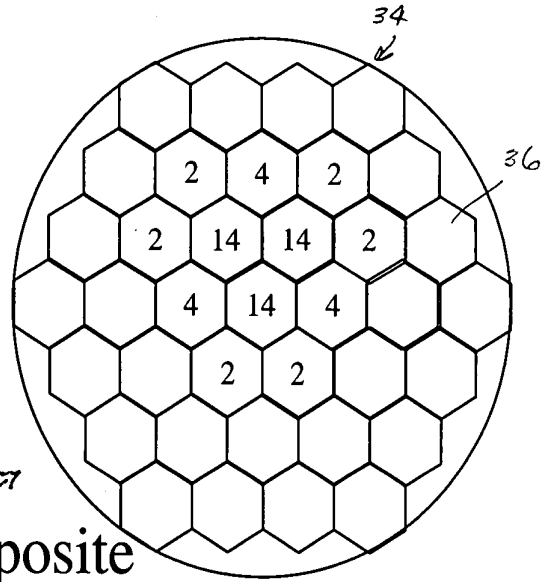


FIG. 19A



Composite

FIG. 19D

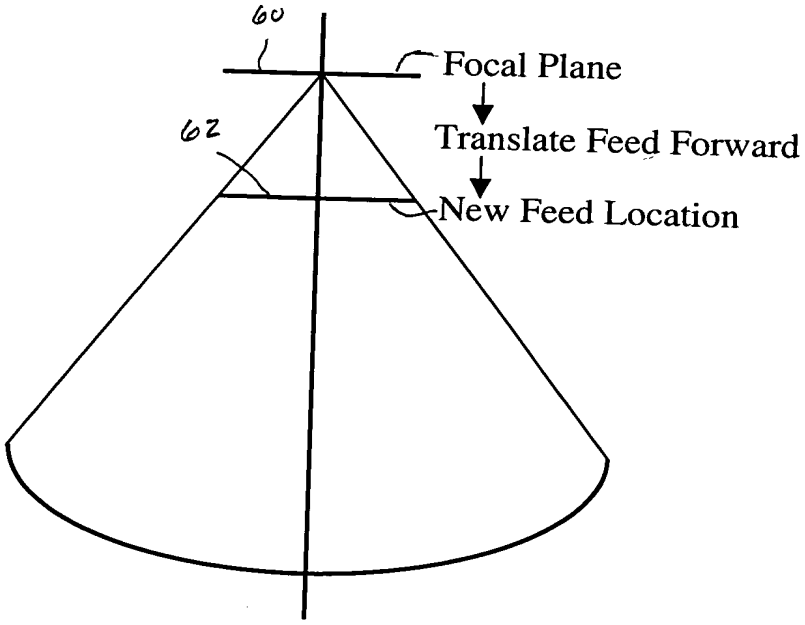


FIG. 20